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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/718,937

11/21/2003

Richard L. Solomon

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7590

12/14/2006

LSI LOGIC CORPORATION
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EXAMINER

SUN, SCOTT C

ART UNIT

PAPER NUMBER

2182

DATE MAILED: 12/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/718,937

Applicant(s)

SOLOMON ET AL.

Examiner

Scott Sun

Art Unit

2182

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-47 is/are pending in the application.
- 4a) Of the above claim(s) 18-28 is/are withdrawn from consideration.
- 5) ☐ Claim(s) 37-47 is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4-9, 15-17 and 29-36 is/are rejected.
- 7) ☐ Claim(s) 3, 10-14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. Applicant's amendment filed 9/21/2006 has been noted and entered. Previous rejections under U.S.C. 112 are withdrawn.

Response to Arguments

2. Applicant's arguments filed 9/21/2006 regarding rejections under U.S.C 101 and U.S.C. 102 have been fully considered but they are not persuasive. Applicant's arguments are summarized as:
 - a. Claims 1, 2, 4 are directed to a method that is done on a tangible medium, and therefore statutory.
 - b. Prior art of record does not disclose "a queue of commands" containing both read and write commands.
3. Regarding argument 'a', examiner notes that applicant appears to imply that the method of claim 1 requires interaction with a tangible medium to be statutory (page 15 of remarks). However, the rejection is also states that the claimed invention does not produce a useful, concrete, and tangible result. Examiner notes that the preamble of claims 1 recites "a method for performing input/output operations on a memory by traversing a queue of commands" (emphasis added) which merely constitutes as intended use. Therefore, the claimed method does not necessarily perform the input/output operations. Merely determining the result of a series of conditional statements is not sufficient in constituting a useful, concrete, and tangible result.

Art Unit: 2182

4. Regarding argument 'b', examiner notes that a queue is merely a logical representation of data, and does not in itself require any physical structure. Applicant argues that prior art of record disclose two queues, instead of a single queue. However, prior art's two queue system can be collectively viewed as a single queue, or a collection of commands in a certain order (linked through the "fence" commands imposing an order of execution on the write and reads as shown in figures 5-10). As a similar comparison, applicant's "single" queue can also be viewed logically as two queues, because in addition to the mixed command queue, there's also a link of write commands (i.e., each write command is connected to the next write command through a pointer) which can be logically viewed as a write command queue. Therefore, there is no distinction between the two-queue system of the prior art and applicant's claimed invention.

5. Having addressed each of applicant's arguments in regarding the U.S.C 101 and 102 rejections, examiner notes that previous grounds of rejection are still valid, as attached below with minor changes to reflect the amended claims.

Claim Rejections - 35 USC § 101

6. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

7. Claim 1 is rejected under 35 U.S.C. 101 because it lacks practical application. Specifically, merely "determining" the result of a series of conditional statements is not a practical application, and does not produce a useful, concrete or tangible result. See *Interim Guidelines for Subject Matter Eligibility*.

8. To expedite a complete examination of the instant application, the claim(s) rejected under 35 USC 101 (nonstatutory) above are further rejected as set forth below in anticipation of applicant amending these claims to place them within the four statutory categories of invention.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1, 2, 3-9, 29-36 are rejected under 35 U.S.C. 102(b) as being anticipated by Langendorf et al (US Patent #6,047,334).

11. Regarding claim 1, Langendorf discloses a method for performing input/output operations on a memory by traversing a queue of commands, comprising: accessing (dequeue logic) a queue entry of a queue of commands (write queue 31, read queue 33); determining if the queue entry includes a valid command (write or read buffer empty; column 12, lines 4-12); determining if the valid command is a read command if

Art Unit: 2182

the queue entry includes a valid command (detection of RD CMD request; column 12, lines 34-36); determining if a next valid write address pointer field if the valid command is determined to be a read command (fence bit; figure 11; column 9, lines 12-15, lines 30-34). Examiner notes that the fence bit, if set, is matched with a corresponding entry in the write queue (also shown in figures 5-7).

12. Regarding claim 2, Langendorf discloses claim 1, and further discloses further comprising, using the Next Valid Write Address pointer of the queue entry to access a second queue entry if the first queue entry includes a next valid write address pointer (fenced NOP1, figure 7; column 10, lines 51-56). Examiner notes that the fenced read command is not processed until the corresponding fenced NOP1 entry is reached in the write queue, and accordingly the fenced bit is used to access the second queue entry.

13. Regarding claim 4, Langendorf discloses claim 1, and further discloses performing the read command if the valid command is a read command (column 11, lines 5-6).

14. Regarding claims 5 and 6, examiner notes Langendorf teaches that the write commands prior to detecting the fenced NOP1 entry are allowed to continue to be dequeued (interpreted as allowing a concurrent write command to complete) and the write commands after the fenced NOP1 entry are halted from dequeuing (interpreted as terminating any concurrent write commands in progress). See column 10, lines 24-27, 35-38).

Art Unit: 2182

15. Regarding claim 7, Langendorf discloses claim 1, and further disclose while determining if the next valid write address pointer is valid, processing the valid command that is a read command (column 9, lines 30-34).
16. Regarding claims 8 and 9, examiner notes these claims are substantially similar to claim 2, and the same grounds of rejection are applied.
17. Regarding claims 15, 16 and 17, Langendorf discloses claim 1, and further teaches that the queue of commands is a circular queue buffer (ring queue) and can be traversed in forward or backward directions (column 6, line 56 – column 7, line 23).
18. Regarding claim 29, Langendorf discloses a system (figure 2, portions shown in detail in figure 3) for traversing a queue of commands, comprising: a means (memory controller 9) for receiving and processing commands (AGP commands), the commands being maintained in a queue having at least two different commands (collection of read/write command queues 31 and 33); a means for storing data (memory 10), the means for storing data being coupled to the means for receiving and processing commands (figure 2, column 5, lines 36-40), the means for storing data receiving and providing data from storage in response to commands from the queue of commands (column 5, lines 20-40); wherein the queue of commands contains a Next Valid Write Address pointer (Q-head of queue advance logic 35; column 6, lines 56-60).
19. Regarding claim 30, Langendorf discloses claim 29 and further discloses means for transferring data to the means for storing data (memory access logic 27 and data lines connecting memory and memory controller) and means for transferring data from

Art Unit: 2182

the means for storing data (memory access logic 27 and data lines connecting memory and memory controller; column 5, lines 36-40);

20. Regarding claim 31, Langendorf discloses claims 30 and further discloses wherein if an instruction for transferring data to the means for storing data (write command) is being processed, an instruction for transferring data from the means for storing data (read command) is simultaneously being processed (column 9, lines 65-67). Examiner notes that Langendorf teaches commands being concurrently enqueued and dequeued (interpreted as being processed) from the command queues.

Furthermore, multiple read and write commands are in the memory controller (also interpreted as being processed).

21. Regarding claim 32, Langendorf discloses claim 31 and further discloses a means for processing (command reordering logic 23) coupled to the means for storing data via the means for transferring data to the means for storing data and the means for transferring data from the means for storing data (figure 2).

22. Regarding claim 33, Langendorf discloses claim 32 and further discloses a means for coupling (line connecting command reordering logic 23 and memory access logic 27) the means for processing to the means for transferring data to the means for storing data and the means for transferring data from the means for storing data.

23. Regarding claim 34-36, Langendorf discloses claim 33, and further discloses the means for coupling is a peripheral bus (system I/O bus 3). Examiner notes that Langendorf teaches that the memory controller 9 is also used to process read and write to the peripherals (column 4, lines 45-56).

Allowable Subject Matter

1. Claims 37-47 are allowed.
2. Claims 3, 10-14 would be allowable if rewritten to include all of the limitations of the base claim and any intervening claims. See reasons for indicating allowable subject matter in previous office action, dated 6/23/2006.

Conclusion

3. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Scott Sun whose telephone number is (571) 272-2675. The examiner can normally be reached on M-F, 10:30am-7pm.

Art Unit: 2182

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kim N. Huynh can be reached on (571) 272-4147. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SS



KIM HUYNH
SUPERVISORY PATENT EXAMINER

12/11/06